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(HIR.228)

AMENDMENTS TO THE CLAIMS

Please amend claims 1, 16, and 17 as follows:

(Currently Amended) A method of controlling a conductivity of a Ga₂O₃ system single 1. crystal, comprising:

adding a predetermined dopant to the Ga₂O₃ system single crystal such that said dopant is substituted for Ga in the Ga₂O₃ system single crystal to obtain a desired conductivity resistivity, wherein said predetermined dopant comprises one of:

a an n-type dopant for decreasing a resistance controlling a conductivity of the Ga₂O₃ system single crystal comprising one of Si, Hf, Ge, Sn, and Ti, said conductivity of the Ga₂O₃ system single crystal being controlled dependently on an adding amount of said n-type dopant; and

a p-type dopant for increasing a resistance controlling said conductivity of the Ga₂O₃ system single crystal comprising one of H, Li, Na, K, Rb, Cs, Fr, Be, Ca, Sr, Ba, Ra, Mn, Fe, Co, Ni, Pd. Cu, Ag, Au, Zn, Cd, Hg, Tl, and Pb, said conductivity of the Ga₂O₃ system single crystal being controlled dependently on an adding amount of said p-type dopant.

2. - 3. (Canceled).

- 4. (Previously Presented) The method of controlling a conductivity of a Ga₂O₃ system single crystal according to claim 1, wherein a value of 2.0 X 10^{-3} to $8.0 \times 10^{2} \Omega$ cm is obtained as the desired resistivity by adding a predetermined amount of said n-type dopant.
- 5. (Previously Presented) The method of controlling a conductivity of a Ga₂O₃ system single crystal according to claim 4, wherein a carrier concentration of the Ga₂O₃ system single crystal is controlled to fall within a range of 5.5 X 10¹⁵ to 2.0 X 10¹⁹/cm³ as a range of the desired resistivity.

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6.-7. (Cancelled).

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- 8. (Previously Presented) The method of controlling a conductivity of a Ga₂O₃ system single crystal according to claim 1, wherein 1 X 10³ Ωcm or more is obtained as the desired resistivity by adding a predetermined amount of said p-type dopant.
- 9. (Withdrawn) A method of forming a Ga₂O₃ system single crystal layer, comprising: heating contacting portions of β-Ga₂O₃ seed crystal and a high purity β-Ga₂O₃ polycrystalline raw material, said β-Ga₂O₃ polycrystalline raw material comprising one of a p-type dopant and an ntype dopant.
- 10. (Withdrawn) The method of forming a Ga₂O₃ system single crystal layer according to claim
 9, wherein said n-type dopant comprises one of Si, Hf, Ge, Sn, and Ti; and

wherein said p-type dopant comprises one of H, Li, Na, K, Rb, Cs, Fr, Be, Ca, Sr, Ba, Ra, Mn, Fe, Co, Ni, Pd, Cu, Ag, Au, Zn, Cd, Hg, Tl, and Rb.

- 11. (Withdrawn) The method of forming a Ga₂O₃ system single crystal layer according to claim 9, wherein said p-type dopant comprises no less than 0.01 mol% and no more than 0.05 mol%.
- 12. (Withdrawn) The method of forming a Ga_2O_3 system single crystal layer according to claim 11, wherein a resistance value of said layer is greater than or equal to 1000 $M\Omega$.

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(Withdrawn) The method of forming a Ga₂O₃ system single crystal layer according to claim 13. 9, wherein said layer comprises a resistivity of no less than 2.0 \times 10⁻³ Ω cm and no more than 8 \times 10² Ωcm; and

wherein a carrier concentration of said layer comprises no less than 5.0 X 10¹⁵ / cm³ and no more than $2.0 \times 10^{19} / \text{cm}^3$.

(Withdrawn) A light emitting element, comprising: 14.

an n-type β-AlGaO3 cladding layer, an active layer, a p-type β-AlGaO3 cladding layer, and a p-type β-Ga₂O₃ contact layer respectively laminated in order on an n-type β-Ga₂O₃ contact layer, said n-type β-Ga₂O₃ contact layer made of a β-Ga₂O₃ single crystal;

a transparent electrode and a pad electrode respectively formed in order on said p-type β-Ga₂O₃ contact layer; and

an n-side electrode formed over a lower surface of said n-type β-Ga₂O₃ contact layer, wherein a desired resistivity of said β-Ga₂O₃ single crystal is obtained, wherein said n-type layers comprise a dopant including one of Si, Hf, Ge, Sn, and Ti, and wherein said p-type layers comprise a dopant including one of H, Li, Na, K, Rb, Cs, Fr, Be, Ca, Sr, Ba, Ra, Mn, Fe, Co, Ni, Pd, Cu, Ag, Au, Zn, Cd, Hg, Tl, and Rb.

15. (Withdrawn) The light emitting element of claim 14, wherein a carrier concentration of said p-type β-Ga₂O₃ contact layer is greater than that of said p-type β-AlGaO₃ cladding layer; and

wherein a carrier concentration of said n-type β-Ga₂O₃ contact layer is greater than that of said n-type β-AlGaO₃ cladding layer.

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16. (Currently Amended) A method of controlling a conductivity of a Ga₂O₃ system single crystal, comprising:

adding a predetermined dopant to the Ga₂O₃ system single crystal such that said dopant is substituted for Ga in the Ga₂O₃ system single crystal to obtain a desired conductivity resistivity,

wherein said predetermined dopant comprises a p-type dopant for controlling a conductivity increasing a resistance of the Ga₂O₃ system single crystal, said p-type dopant comprising one of H, Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Ra, Mn, Fe, Co, Ni, Pd, Cu, Ag, Au, Zn, Cd, Hg, Tl, and Pb, said conductivity of the Ga₂O₃ system single crystal being controlled dependently on an adding amount of said p-type dopant.

17. (Currently Amended) The method of controlling said conductivity of said Ga₂O₃ system single crystal according to claim 16, wherein the predetermined dopant comprises one of:

said p-type dopant; and

an n-type dopant for controlling said conductivity decreasing said resistance of the Ga₂O₃ system single crystal.

- 18. (Previously Presented) The method of controlling a conductivity of a Ga₂O₃ system single crystal according to claim 17, wherein said n-type dopant comprises one of Si, Hf, Ge, Sn, Ti, and Zr.
- 19. (Previously Presented) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 17, wherein a value of 2.0 \times 10⁻³ to 8.0 \times 10² Ω cm is obtained as the desired resistivity by adding a predetermined amount of said n-type dopant.

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20. (Previously Presented) The method of forming a Ga₂O₃ system single crystal layer according to claim 19, wherein a carrier concentration of the Ga₂O₃ system single crystal is controlled to fall within a range of 5.5 X 10¹⁵ to 2.0 X 10¹⁹/cm³ as a range of said resistivity.

21. The method of controlling a conductivity of a Ga₂O₃ system (Previously Presented) single crystal according to claim 16, wherein 1 X 10³ Ω cm or more is obtained as the desired resistivity by adding a predetermined amount of said p-type dopant.